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gins of the larval valves, lined with ectoblast (mantle), into which the vent opens. The anterior adductor muscle degenerates after fixation, when its function is assumed by the posterior adductor, which develops after the former. The cephalic ganglion originates from an epiblastic thickening situated in the center of the trochal disk or velum. The larval shell is homogeneous; but at the hinge there are two small teeth separated by an interval from each other.

The earlier stages are copied from Möbius, who incorrectly represents the nucleolus of the ripe egg as being spheroidal, whereas the writer has shown it to be a double body in the ova of the three species, including *O. edulis*, investigated by him.[1]

Dr. Horst's more recent investigations upon the early growth and fixation of the fry or veliger stage of *O. edulis* and its metamorphosis into the "spat" are of great and significant interest. Carrying out more fully a suggestion made by the writer in 1881, Dr. Horst used a wooden frame, into which could be fixed a large number of glass slides, such as are used by microscopists. This frame, with its contained slides, some of which were coated with hydraulic cement, was immersed for a period of seventy-two hours in waters where free-swimming oyster larvæ were known to exist, at the end of which time spat was found adhering to the slides, measuring 0.24^{mm} in height ($\frac{1}{104}$ of an inch). After fixation, which seems to occur in the same way as in the American species, the permanent shell is formed or built up by the mantle beyond the margins of the valves of the fry, a homogeneous membrane, subdivided internally into polygonal spaces or areas, being first laid down by the mantle border. In these prismatic areas of the periostracum, calcification occurs by the deposit of calcic carbonate, and the shell is thus moulded upon the membranous matrix of conchioline. Attachment and growth of the young edible oyster, according to Horst, is very similar to that of the American species, as described by the writer (Bull. U. S. Fish Commission, ii, 1882, p. 383). The outgrowth of the first branchiæ as two series of distinct ciliated processes projecting into the mantle cavity of the spat is interesting as showing that the more primitive condition of the lamellibranchiate gill was much simpler than in the existing adult oyster.

PHYSIOLOGY.[2]

THE TEMPERATURE SENSE.—By an ingenious device Dr. Politzer has been able to make what are probably exact determinations of the sensitiveness to heat of the skin in different parts of the body. The rounded bottom of a small platinum cylinder was heated to a constant temperature by means of benzole spray. The cylinder was raised or lowered by a rack and pinion arrangement and the distance between cylinder and skin was determined at which the radiant heat could just be perceived. The relative sensitiveness of the skin in different parts is calculated as being inversely as the squares of the distances measured. The following table indicates the relative sensitiveness to heat of different parts of the skin, the sensitiveness of the palmar surface of the third phalanx of the index finger being considered as 100:

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[1] Bull. U. S. Fish Commission, II, 1882, p. 213.

[2] This department is edited by Professor HENRY SEWALL, of Ann Arbor, Mich.

Finger.	Dors. Hand.	Back.	Forearm.	Palm.	Calf.
100	204	204	270	294	314

It follows from the observations made that, "1. The relative sensitiveness to heat in different parts of the body is not the same in different individuals. 2. It differs much less in different parts of the same individuals than the sensitiveness to pressure or power of localization, the greatest difference for heat being as three to one; while for pressure it is at least as five to one, and for localization as sixty to one. 3. The parts in which the other cutaneous senses are most acute are not the same as those in which there is greatest sensitiveness to heat. 4. Of the parts examined, the tip of the index finger is the least sensitive; in the other parts where the sense of locality is from five to thirty times as dull, the thermal sense is from two to three times as acute. 5. The thermal sensitiveness bears no definite relation to the thickness of the epidermis." On the contrary the time necessary for an increase of temperature to be perceived depends directly upon the thickness of the epidermis which is heated (*Jl. Physiology*, Vol. v, p. 143).

Drs. Lombard and Walton seek to explain temperature sensations as the outcome of mechanical stimulation of sensory nerves whose endings are submitted to strain due to unequal expansion of the two layers of the skin when its temperature is changed. These authors find that various fresh animal tissues, as tendon, expand when warmed, and contract when cooled; others, as elastic tissue, contract when warmed and expand on cooling; the epidermis, separated by maceration, is scarcely affected by temperature, while the skin as a whole acts like elastic tissue. It appears, then, that tensions between dermis and epidermis would be brought about by changing the temperature of the skin. In the experiments referred to the temperature was varied between 0° and 63°C.—*Centralbl. f. Med. Wiss., 1883, No. 32.*

RHYTHMIC CONTRACTION OF THE CAPILLARIES IN MAN.—Local and obscurely automatic rhythmic contraction of the bloodvessels is an established fact. Wharton Jones found that the veins in the bat's wing underwent rhythmic expansions and contractions even after there was good reason to suppose that the influence of extrinsic nerve centers was excluded. Such venous contractility must be a very important factor in the circulation of the blood. An artificial current of blood forced under constant pressure through the vessels of an excised, but living muscle, undergoes alternate acceleration and diminution which can only be explained by changes in the caliber of the muscular vessels.

Dr. Lauder Brunton describes a simple experiment, but not one very easy to verify, by means of which rhythmical contraction and dilatation of the capillaries in man may be demonstrated. If the finger-nail be drawn once or twice up and down the middle of the forehead a red streak remains which may persist many minutes. This streak undergoes variations in width and brightness, some of which correspond to the heart-beat, others to the movements of respiration, and still another series have a slower rhythm of some twenty seconds interval; these last changes probably have their origin in purely local contractions of the capillary walls.—*Jl. Physiology, Vol. v, p. 14.*

THE PISTON RECORDER. — Schäfer describes a very simple device for registering graphically the variations in volume of a frog's heart, which may find quite general application. The organ whose changes of volume are to be measured is inclosed in a vessel filled with fluid which communicates with a horizontal glass tube of 3-4 $^{\mathrm{mm}}$ diameter containing oil. A disk of platinum fits closely in the tube and is in contact with the oil column whose movements it follows perfectly without allowing the escape of oil round its rim. An aluminium rod of proper length, bearing a writing point at one end, is fastened to the center of the platinum disk, and the piston rod passing through a hole in a cap at the end of the glass tube is kept moving in the center of the latter. —*Jl. Physiology, Vol. v, p. 130.*

THE ORIGIN OF FIBRIN FORMED IN THE COAGULATION OF BLOOD. —Research upon the cause of blood clotting has been rendered very difficult because of rapidity of the process of coagulation in the blood of most animals. Dr. Howell has discovered that the blood of the terrapin clots very slowly and offers unequaled advantages for the study of its chemical changes. A sample of this blood left in a refrigerator at 15° to 20° C. was found still perfectly fluid at the end of a week; the corpuscles had completely settled leaving a deep layer of clear plasma above. A very careful series of experiments led the author to uphold that view of coagulation according to which the process is due to the transformation of a single chemical body, fibrinogen, which exists pre-formed in the blood plasma, into fibrin under the influence of fibrin-ferment, which is a product of the dissolution of white blood corpuscles. —*Stud. Biol. Lab. Johns Hopkins Univ., Vol. iii, p. 63.*

VOLUNTARY ACCELERATION OF THE HEART-BEAT IN MAN.— There are on record a number of well-authenticated cases in which the rate of heart-beat seems to have been under easy control of the will. As is well known, the pulse rate and character is normally profoundly influenced by the emotions, and there is little doubt that in most of the cases recorded the alteration in heart rhythm was brought about indirectly through the excitement of the appropriate psychical condition. In fact, simple concentration of the attention on the heart movement is sufficient, in most cases, to alter the regularity or rate of its rhythm, and it is probably impossible for one to make an accurate estimate of his own pulse. But there are several instances in which the connection does not seem to have been so clear. Tüke investigated the case of an old man who at will could increase his heart rhythm by twenty beats per minute. A Lieut. Townsend could restrain respiration and heart beat until he fell into a death-like condition and the body began to grow cold. Professor Tarchanoff reports a series of experiments carried out on a student who could voluntarily hasten his heart-beat from about 90 to 120 beats per minute. The patient declared that this acceleration was not preceded by any special emotion, and mere thinking of the condition would not produce it, but that a direct and fatiguing effort of the will was necessary to cause the quickening. Comparative measurements showed that during the acceleration there was no constant alteration of the respiration, but that the blood pressure uniformly rose with the heart beat.—*Pflüger's Archiv. Bd., 35, p. 109.*

PSYCHOLOGY.

INTELLIGENCE OF A SETTER DOG.—In the winter of 1880 I purchased in the East a dog puppy out of a purely bred English Gordon setter bitch, by the well known prize-winning Irish water spaniel, Bramton Barney.

He was the only puppy in the litter and no other puppies came from the same cross, for the reason that the bitch died soon after, and bringing the puppy here he was named Barney, and keeping him in the office where there were several persons employed, his exceeding good nature was courted and his naturally pleasing (aside from his determination), yet nervous disposition was encouraged.

After a little training Barney took to retrieving, but his more noticeable traits was the working up of some mischievous act of his, which, though puppy-like, would at times be so unlike the ordinary as to appear to the observer as original.

In the spring following, when but about six months old, he retrieved his first duck from water, and this one being a wounded ruddy duck made the young "dropper" labor hard to make good the catch and bring the bird to me, as it was yet alive.

From this time on there seemed no difficulty in getting him to go for a wounded or dead bird at any time, but owing to his exceedingly stubborn nature he was very hard to govern in such manner that he would perform the service as work and not as play. At all times he was making new surprises, but only minor ones until the coming fall, when he was about one year old. At this time I was hunting in a marsh near here and had walked out into the water to a depth of about two feet and some one hundred yards from shore, breaking the ice which, by the way, was not very thick. Barney without a whine followed after me and without